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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

**MAILED**  
**JAN 16 2008**  
**GROUP 1700**

Application Number: 10/654,099  
Filing Date: September 03, 2003  
Appellant(s): TANAKA, YOSHIKI

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Sandra M. Katz  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 26 October 2007 appealing from the Office action mailed 8 March 2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

JP 2001-266724 A	Tanaka	09-2001
(JP 13-266724 A)		
JP 403110732 A	Ishioka	05-1991
GB 2028608 A	Cole	03-1980

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 3-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka (JP 2001-266724 A).

In regards to claims 3-4, Tanaka (JP '724) discloses (0010) an alloy thermal fuse comprising a thermal fuse element having an alloy composition containing 40 to 46 weight percent tin, 7 to 12 weight percent bismuth, 0.5 to 3.5 weight percent silver, remainder indium. Tanaka (JP '724) does not necessitate the addition of any element whose use is prohibited due to its harmful effects on a living body. The amounts of bismuth, silver, and indium overlap the claimed ranges, which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the desired amounts of bismuth, silver,

and indium from the ranges disclosed by Tanaka (JP '724) because Tanaka (JP '724) disclose the same utility throughout the disclosed ranges.

With respect to the range of tin in claims 3-4, the Examiner notes the closeness of the range disclosed by Tanaka (JP '724) (i.e. 40 to 46 weight percent) to the claimed range (i.e. greater than 46% to 70%). It has been held that "a prima facie case of obviousness exists when the claimed range and the prior art range do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties." MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art to select an amount of tin slightly greater than 46 weight percent because one skilled in the art would have expected the same properties as an alloy having 46 weight percent tin.

In regards to claims 5-6, the Examiner asserts that the alloy disclosed by Tanaka (JP '724) would have inevitable impurities.

In regards to claims 7-10, Tanaka (JP '724) discloses (0017-0019 and Figure 4) connecting the fuse element between lead conductors wherein at least a portion of each of the lead conductors is bonded to said fuse element covered with a silver paste (i.e. film).

Claims 11-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka (JP 2001-266724 A) as applied to claims 3-10, and further in view of Ishioka (JP 403110732 A).

In regards to claims 11-18, Tanaka (JP '724) discloses (Figure 3 and 0018) that lead conductors are bonded to ends of a fuse element, respectively, a flux is applied to

the fuse element, said flux-applied fused element is passed through a ceramic tube (i.e. cylindrical case), and gaps between ends of the ceramic tubing and the lead conductors have a disk-like shape, and ends of the fuse element are bonded to front faces of the disks.

Ishioka (JP '732) discloses (abstract) providing lead conductors with a disk-like shape at the ends of the lead conductors and bonding the fuse elements to the front faces of the disks in order to prevent flux from adhering to the ends of the cylindrical case and to achieve quick separation when the fuse is activated. It would have been obvious to one of ordinary skill in the art to modify the method of Tanaka (JP '724) by providing lead conductors with a disk-like shape at the ends of the lead conductors and bonding the fuse elements to the front faces of the disks in order to prevent the flux from adhering to the ends of the cylindrical case and to achieve quick separation when the fuse is activated, as disclosed by Ishioka (JP '732) (abstract).

Claims 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka (JP 2001-266724 A) or Tanaka (2001-266724 A) in view of Ishioka (JP 403110732 A), and further in view of Cole (GB 2028608 A).

In regards to claims 23-28, the aforementioned references do not specify providing a heating element for fusing off said fuse element. However, Cole (GB '608) discloses (abstract) providing a resistor to blow a thermal fuse in order to terminate heating in a heating circuit for an electric blanket.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the aforementioned references by providing a

resistor to blow a thermal fuse in order to terminate heating in a heating circuit for an electric blanket, as disclosed by Cole (GB '608).

#### **(10) Response to Argument**

First, the Appellant primarily argues that although the ranges of bismuth and indium in the alloy disclosed by Tanaka (JP '724) overlap the ranges disclosed in the instant invention, the overall alloy compositions do not overlap. In response, the Examiner notes that the amount of silver disclosed by Tanaka (JP '724) also overlaps the range of the instant invention. Further, It has been held that "a prima facie case of obviousness exists when the claimed range and the prior art range do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties." MPEP 2144.05 I.

Second, the Appellant primarily argues that increasing the amount of tin in Tanaka (JP '724) would have necessitated a reduction in the concentration of at least one of the other elements, such as less than 7 weight percent bismuth or less than 42 weight percent indium; Tanaka (JP '724) teaches away from reducing the bismuth concentration to below 7 weight percent by explaining that when the concentration of bismuth is less than 7 weight percent, it becomes difficult to draw the alloy into a wire with the desired diameter of 300  $\mu\text{m}$  due to the improper ductility of the material; and the Examiner offers no motivation to vary the prior art concentrations in order to arrive at the claimed concentrations, and thus has not established a prima facie case of obviousness. In response to this argument, the Examiner notes that the instant claims

recite "... and In is at least 18 weight % and less than 48 weight %..." and Tanaka (JP '724) discloses (claim 2) for example, 0.5 to 3.5 weight percent silver, 40 to 46 weight percent tin, 7 to 12 weight percent bismuth, and *remainder* of indium. Therefore, less than 42 weight percent indium would not conflict with the composition recited in the instant claims or that of Tanaka (JP '724). Also, this modification would not require reducing the concentration of bismuth below 7 weight percent. It has been held that "a prima facie case of obviousness exists when the claimed range and the prior art range do not overlap but are close enough such that one skilled in the art would have expected them to have the same properties." MPEP 2144.05 I.

Third, the Appellant primarily argues that an alloy composition, such as that taught by Tanaka (JP '724), which falls on the binary eutectic curve, does not exhibit the unexpected properties of the claimed alloy fuses: a narrow operating temperature range and excellent overload and dielectric breakdown characteristics. In response, the Examiner notes that the Appellant has not, on the record, compared the alloy compositions of closest prior art with that of the instant invention to exhibit these unexpected properties. MPEP 2145.

Fourth, the Appellant primarily argues that because Tanaka (JP '724) teaches that when the concentration of bismuth in the ternary alloy is less than 7 weight percent, it becomes difficult to draw the alloy into a thin wire having a diameter of 350  $\mu\text{m}$ , due to improper ductility and because in the Appellant Specification, a variety of Sn-In-Bi alloys were prepared which contained only 1 weight percent bismuth (less than 7 weight percent bismuth), all were found to exhibit good wire drawability, the drawability of



alloys containing less than 7 weight percent bismuth would not have been expected based on Tanaka (JP '724) which presents an unexpected property, which is evidence of non-obviousness. In response, the Examiner notes that the range of bismuth recited in the instant claims is at least 1 weight percent to less than or equal to 12 weight percent bismuth. Therefore, the teachings of Tanaka (JP '724) overlap that of the instant invention because the scope of the concentration of bismuth in Tanaka (JP '724) (7 to 12 weight percent bismuth) instant claims overlaps the concentration of bismuth of the instant invention (at least 1 weight percent to less than or equal to 12 weight percent bismuth). Therefore, the good wire drawability of the instant invention would be expected. MPEP 2144.05 I.

Fifth, the Appellant primarily argues that there would have been no motivation to combine Tanaka (JP '724), Ishioka (JP '732), and Cole (GB '608). In response to the Appellant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, all three references either directly or indirectly relate to the field of thermal fuses, as is shown in **(9) Grounds of Rejection** above. Therefore, the knowledge presented by these references would have been available to one of ordinary skill in the art at the time the invention was made. The

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fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Jessee Roe, Art Unit 1793



Conferees:

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**ROY KING**  
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Romulo Delmendo, Appeal Conferee